

PATENT ABSTRACTS OF JAPAN

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(21)Application number : 11-195600 (71)Applicant : MATSUSHITA
ELECTRIC IND CO LTD
(22)Date of filing : 09.07.1999 (72)Inventor : TOMINAGA KIYOSHI
TANIGUCHI HIDEKI

(54) DISK MEDIA, RECORDING METHOD, RECORDER AND
REPRODUCING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent the discontinuity of information which takes place in a boundary area because the boundary area between stream information is not guaranteed to be physically continued due to the limitation of the read/write speed of disk media in the case of recording a plurality of pieces of stream information in disk media.

SOLUTION: A continuous area complementing means 16 performs primary allocation of an unused area that takes place at the end of a stream information record to a continuous area currently secured by a continuous

area allocating means 14, the means 14 can continuously secure the boundary area of stream information by a recorder of a configuration to be used or the method from the primary allocation area so that continuous reproduction extending streams can be performed when the next stream information is recorded.

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CLAIMS

[Claim(s)]

[Claim 1] An information acceptance means to accept the stream information containing at least one of an image or the voice, An input setting means to set up the attribute information on said stream information, and an information

record means to record said stream information on disk media, The free-area management tool which acquires the information about the current availability of said disk media from said information record means, A continuation field allocation means to secure the continuation field for recording the stream information from said information acceptance means continuously based on the print-out of said free-area management tool to said disk media, The disk media record regenerative apparatus which consists of continuation field complement means to detect the free space of said continuation field where the termination data of said stream information were recorded as a primary allocation field, and to memorize it, and memorizes the following stream information from said primary allocation field after record termination of said stream information.

[Claim 2] The record regenerative apparatus of disk media [equipped with the input setting means including an attribute information automatic distinction means to analyze the stream information from an information acceptance means, and to acquire attribute information, and an attribute information setting means to set up the attribute information created with said attribute information automatic distinction means] according to claim 1.

[Claim 3] An information acceptance means to accept the stream information containing at least one of an image or the voice, An input setting means to set up the attribute information on stream information, and the information record means which carries out record-keeping of the stream information to disk media, The free-area management tool which acquires the information about the current availability of said disk media, A record situation monitor means to supervise the record situation at the time of information record to said disk media, The recording device of the disk media which consist of continuation field allocation means to secure a continuous field to said disk media based on the print-out of said free-area management tool, and the print-out of said record situation monitor means.

[Claim 4] The recording device of disk media [equipped with the record situation monitor means including an information reading means to read information from a record medium, and a record condition discernment means to discriminate the record situation of a record medium from the read

information] according to claim 3.

[Claim 5] An information acceptance means to accept the stream information containing at least one of an image or the voice, An input setting means to set up the attribute information on said stream information, and the information record means which carries out record-keeping of said stream information to disk media, The free-area management tool which acquires the information about a current availability from said information record means, The recording device of the disk media which consist of a continuation field allocation means to secure a continuous field to disk media based on the information on said free-area management tool, and a node information edit means to edit the information before and behind connection of said stream information in the node of the aforementioned continuous field.

[Claim 6] The recording device of disk media [equipped with the node information edit means including the edit means of an MPEG packet array] according to claim 5.

[Claim 7] In the recording device of the disk media which memorize the stream information which contains at least one of an image or the voice in disk media After memorizing said stream information to the continuation field assigned to said disk media, The disk media record approach characterized by registering a free space in said continuation field in which the termination of said stream information was memorized as a primary allocation field, and starting record for storage of the following stream information from said primary allocation field.

[Claim 8] The disk media record approach characterized by supervising the record situation to said disk media, and expanding and contracting the die length of said continuation field according to said record situation in the recording apparatus of the disk media which memorize the stream information which contains at least one of an image or the voice in disk media in case said stream information on said disk media is recorded on a continuation field.

[Claim 9] The disk media record approach characterized by editing the information before and behind connection of said stream information in the recording apparatus of the disk media which memorize the stream information which contains at least one of an image or the voice in disk media.

[Claim 10] Disk media characterized by having recorded the first edge of said following stream information on the free space of said continuation field which was memorized to the continuation field in the stream information containing at least one of an image or the voice, and memorized the termination of said stream information, and recording the management information of said free space.

[Claim 11] Disk media characterized by the die length of said continuation field changing according to the record situation of a continuation field that the stream information containing at least one of an image or the voice was memorized.

[Claim 12] Disk media characterized by having memorized the stream information containing at least one of an image or the voice to the continuation field, and editing the information before and behind connection of said stream information.

[Claim 13] The disk media regenerative apparatus which reads the stream information recorded on disk media according to claim 10, 11, or 12, and is reproduced.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the information record and information playback in the digital information field.

[0002]

[Description of the Prior Art] It is asking for the man in the street who is not an expert memorizing an animation and speech information to disk media, such as a hard disk and an optical disk, and being able to perform edit of an image etc. easily recently. In this case, the Prior art which carries out record playback of the image and voice which come out at disk media is explained

using a drawing.

[0003] Drawing 9 shows the block diagram of the recording device of the conventional disk media.

[0004] An information acceptance means for 92 to accept the stream information containing at least one of an image or the voice in drawing 9 , and to have the buffer memory for temporary storage, An input setting means by which 91 sets up attribute information, such as a transfer rate of stream information, and a class, An information record means by which 95 carries out record-keeping of the stream information to disk media, The free-area management tool from which 93 acquires the information about the current availability of disk media with the information record means 95, and 94 secure a continuous field to disk media based on the information on the free-area management tool 93. It is a continuation field allocation means to record the stream information from the information acceptance means 92 on disk media.

[0005]

[Problem(s) to be Solved by the Invention] When recording two or more stream information on disk media, in order to perform continuation record and playback, it is necessary to secure from a limit of reading/drawing speed of a disk the field which continued physically.

[0006] With the above-mentioned conventional configuration, the utilization ratio of disk media etc. will be given priority to and secured based on the size of the stream information which records the free area of the disk media which exist in fragments.

[0007] Especially the relevance of the physical positional information between the free areas which are secured in the above-mentioned case is not taken into consideration.

[0008] Therefore, when recording two or more stream information, there is no security to which the border area becomes continuously physically, and there is no guarantee to which continuation record and playback are carried out.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned problem, this invention determines and secures the die length of a physical continuation field based on the transfer rate of the stream information into

which the free area of disk media is inputted etc., assigns the free space of the continuation field containing the termination of the stream information under record which is carrying out current reservation as a temporary use field, and uses it for the record location of the first edge of the following stream information in the termination of record of stream information.

[0010] Moreover, in this invention, the die length of the continuation field which detects record situations, such as a record mistake, and records stream information is expanded and contracted at the time of record of the stream information on disk media.

[0011] Furthermore, this invention is before and after connection of two stream information which gets mixed up, and edits replacing a part of front stream information with a part of next stream information etc.

[0012] By the above-mentioned disk media record approach and an above-mentioned disk media recording apparatus, and disk media, lack of the stream information between stream information is prevented, and the continuity at the time of playback of stream information is guaranteed.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail using a drawing.

[0014] (Gestalt 1 of operation) Drawing 1 is the outline block diagram of the recording device of disk media in which the gestalt 1 of operation of this invention is shown.

[0015] An information acceptance means to accept the stream information in which 12 contains at least one of an image or the voice in drawing 1 , An input setting means by which 11 sets up attribute information, such as a transfer rate of stream information, and a class of stream, An information record means by which 15 carries out record-keeping of the stream information to disk media, The free-area management tool with which 13 acquires the information about the current availability in disk media, A continuation field allocation means by which 14 secures a continuous field to disk media based on the information on the free-area management tool 13, and 16 are continuation field complement means which assign the field released as a primary use field, when a continuous field is released without being used to

the last.

[0016] Actuation of the recording device of the disk media of the gestalt 1 of operation of this invention constituted as mentioned above is explained.

[0017] By the information acceptance means 12, the stream information containing at least one of an image or the voice is incorporated. Moreover, from the input setting means 11, attribute information, such as a transfer rate of the stream information incorporated and a stream class included, is set up. And the information about the present use field and present free area of the information record means 15 which record stream information with the free-area management tool 13 and which are a medium is acquired and managed. The continuation field allocation means 14 assigns the field in which the continuation writing and continuation reading based on the attribute information from the input setting means 11 and the management information of the free-area management tool 13 are possible to disk media with the information record means 15, and transmits the stream information sent to the field from the information acceptance means 12.

[0018] Then, when incorporation of single stream information is completed, the field which was not used in the field secured by the continuation field allocation means 14 is registered into disk media with the information record means 15 as a primary allocation field by the continuation field complement means 16.

[0019] And again, when incorporation of stream information is started from the information acceptance means 12, the continuation field allocation means 14 uses preferentially the primary allocation field registered into disk media.

[0020] Drawing 3 is the explanatory view of the continuation field complement actuation in the gestalt 1 of operation of this invention.

[0021] It explains using drawing 3 in more detail about the case where DVD-RAM media and DVD-VR (Video Recording) are used. Here, the case where Stream#2 of 32 are recorded as Stream#1 of 31 is explained.

[0022] the case where Stream#1 of 31 is written on DVD-RAM -- usually -- Stream#1- of 33 -- Stream#1- of 1 and 34 -- it is divided and recorded on n fields, such as Stream#1-n of 2 and 35. Stream#2 [moreover,] of 32 -- the same -- Stream#2- of 36 -- Stream#2- of 1 and 37 -- it is divided and recorded

on the n fields Stream#2-n of 2 and 38. In this case, L#1 which is the die length of Stream#1-2 of 34 is the die length with which were satisfied of CDA (Contiguous DataArea) in DVD-VR.

[0023] CDA is a value computed from the transfer rate of stream information, or the data buffer size by the side of playback, and the thing of the continuous storage region secured in order to enable data supply, without making the residue of the data buffer by the side of playback drained in what kind of case is shown, realizing the writing of stream information in the real time.

[0024] There is no guarantee to which the field of Stream#1-n of 35 which includes the information on the termination of Stream#1 of 31 when incorporating two stream information is satisfied with the Prior art of CDA. Moreover, the field just behind the field 35 of Stream#1-n has possibility of being used by the recording start of Stream#2 of 32 after record of 31 of Stream#1. Therefore, when Stream#2 of 32 are recorded, Stream#1-n of 35 and Stream#2-1 of 36 are read continuously and it does not memorize physically in a continuous location, the actuation which moves the location of the read-out pick of disk media between streams is needed. Although read-out processing of stream information is not performed during this pick migration actuation, since playback is continued, sequential consumption of the data buffer by the side of playback is carried out. Therefore, depending on the residue of a data buffer, a buffer will be in an exhaustion condition, and there is possibility that continuation playback becomes impossible.

[0025] So, with the gestalt 1 of operation, it sets at the time of record termination of Stream#1-n of 35. the continuation field which is the die length with which are satisfied of CDA, and was assigned by the continuation field allocation means 14 at the time of the recording start of Stream#1-n of 35 -- L#, if it is the die length L#2 actually used for record of Stream#1-n of 4 and 35 Padding of 39 which is the field of the die length of $L\#3 = L\#4 - L\#2$ is registered as a primary allocation field with the continuation field complement means 16.

[0026] And by using first the Padding field 39 which is this field currently assigned temporarily at the time of incorporation initiation of the stream information of Stream#2 on 32, it becomes the field configuration of 3-4, and

Stream#1-n and Stram#2-1 satisfy CDA and the continuation playback of them is attained.

[0027] Here, the continuation field assigned by the continuation field allocation means 14 is the field which is the classification of the short allocation descriptor for example, in UDF specification and which used ["although assigned, it have not recorded", and] in the Padding field 39 which is the field which is the classification of the short allocation descriptor in UDF (Universal Disk Format) specification, and which was used ["it is assigned and it be recorded" and], and makes into a primary allocation field with a continuation field complement means 16.

[0028] As mentioned above, according to the gestalt of this operation, by using it from the field which assigns primarily the free space of the continuation field which was carrying out current reservation in the termination of stream information record, and was first assigned primarily previously on the occasion of record of the following stream information, it becomes securable continuously about the border area of stream information, and the continuation playback over between streams is attained.

[0029] (Gestalt 2 of operation) Drawing 2 is the outline block diagram of the gestalt 2 of operation of the input setting means of the recording device of the disk media of this invention.

[0030] In drawing 2 , the input setting means 11 consists of an attribute information automatic distinction means 21 which takes out attribute information from the stream information on the information acceptance means 12, and an attribute information setting means 22 to tell the continuation field allocation means 14 only about required information out of the taken-out attribute information.

[0031] Actuation of the input setting means 11 of the disk media recording device of the gestalt 1 of the operation constituted as mentioned above is explained. Out of the stream information taken in from the information acceptance means 12 by the attribute information automatic distinction means 21, the information which is recording the stream attribute is distinguished and it takes out automatically. And information required to decide a continuation field is discriminated from the attribute information taken out by the attribute

information setting means 22, and it is set as the continuation field allocation means 14.

[0032] Here, the information which needs the attribute information automatically taken out by the attribute information automatic distinction means 21 for the continuation field allocation means 14 which is the header information included in an MPEG stream, and is set up by the attribute information setting means 22 is the information on the transfer rate currently written in in header information etc.

[0033] As mentioned above, according to the gestalt of this operation, a setup of the information for deciding a continuation field automatically is attained from the information to incorporate, and automation of a setup of input can be attained.

[0034] (Gestalt 3 of operation) Drawing 4 is the outline block diagram of the recording device of disk media in which the gestalt 3 of operation of this invention is shown.

[0035] An information acceptance means to accept the stream information in which 42 contains at least one of an image or the voice in drawing 4 , An input setting means by which 41 sets up the attribute information on stream information, an information record means by which 45 carries out record-keeping of the stream information to disk media, The free-area management tool with which 43 acquires the information about the current availability of disk media, A record situation monitor means by which 46 supervises record situations, such as a record error at the time of information record to disk media and a defect, and 44 are continuation field allocation means to secure a continuous field to disk media based on the information on the free-area management tool 43, and the information on the record situation monitor means 46.

[0036] Actuation of the record approach of the disk media of the gestalt 3 of the operation constituted as mentioned above is explained.

[0037] By the information acceptance means 42, the stream information containing at least one of an image or the voice is incorporated. Moreover, from the input setting means 41, attribute information, such as a transfer rate of the stream information incorporated and a stream class included, is set up.

And the information about the present use field and present free area of the information record means 45 which record stream information with the free-area management tool 43 and which are a medium is acquired and managed. The record situation monitor means 46 supervises the record situation of the information record means 45 to disk media, and manages the information. The continuation field allocation means 44 assigns the field in which the continuation writing and continuation reading based on the attribute information from the input setting means 41, the management information of the free-area management tool 43, and the record status information of the record situation monitor means 46 are possible to the information record means 45, and transmits the stream information sent to the field from the information acceptance means 42.

[0038] It explains in more detail about the case where DVD-RAM media are used using drawing 6 .

[0039] With the conventional technique, when securing a continuation field, the field 61 suitable based on the transfer rate information from the input setting means 41 etc. and the information managed with the free-area management tool 43 is chosen by the continuation field allocation means 44. However, although the die length L#1 of the continuation field 61 must be enlarged properly speaking when an error occurs in this case in the middle of write-in [of the die length L#1 of the continuation field 61 assigned with the continuation field allocation means 44] There is no guarantee which can secure the field just behind the continuation field 61, and the continuation field 61 may stop fulfilling the specification as a field in which continuation writing and continuation reading are possible. Moreover, in carrying out the quantum reservation of the complement field 62 beforehand, there is evil which there is possibility that a difference with the actually used field will become large, and uses a field useless as a result.

[0040] Then, the situation at the time of always being written in disk media with the information record means 45 is supervised with the record situation monitor means 46, and the error occurrence frequency is detected and kept. And the continuation field allocation means 44 writes in the field which applied the die length L#2 of the complement field 62 to the die length L#1 of the

continuation field 61 as a new continuation field according to the error occurrence frequency managed with the record situation monitor means 46, and secures it in front.

[0041] Here, the die length L#2 of the complement field 62 is dynamically changed based on the value computed by for example, the count of count of error frequency = error generating / writing.

[0042] The secured continuation field becomes possible [raising the probability to satisfy the specification as a field in which continuation writing and continuation reading are possible], without using a useless field by using the error occurrence frequency to a record medium as mentioned above according to the gestalt of this operation.

[0043] (Gestalt 4 of operation) Drawing 5 is the outline block diagram of the gestalt 4 of operation of the record situation monitor means of the recording device of the disk media of this invention.

[0044] In drawing 5 , the record situation monitor means 46 consists of storage condition discernment means 52 to identify and manage the state of impairment of a record medium from the management information of the record medium read with an information reading means 51 to read the management information of a record medium from the information record means 45, and the information reading means 51.

[0045] Explanation of the record situation monitor means 46 of the gestalt 4 of the operation constituted as mentioned above reads the management information in disk media, for example, the write-in defective information and breakage information on a record medium, with the information reading means 51. And the record condition of a record medium is judged from those information with the storage condition discernment means 52, and it manages.

[0046] Here, the record condition identified by the storage condition discernment means 52 is the defective information on the operating condition of a shift field, or a physical sector for example, in disk media.

[0047] Drawing 6 is the explanatory view of the continuation field complement actuation by the record situation in the gestalt 3 of operation of the disk media recording device of this invention. It explains in more detail about the case where DVD-RAM media are used using drawing 6 . In drawing 6 , the

information on the die length L#3 of all the shift fields 63 or the die length L#4 of the used shift field 64 is read from disk media with the information reading means 51. and the storage condition discernment means 52 -- the storage condition of media -- for example, storage -- it computes by the condition = used shift field L#4/ all shift field L#3, the die length L#2 of the complement field 62 is determined according to the rate, and the die length of the continuation field secured before the writing of stream information is complemented.

[0048] Here, the shift field of the disk media read with the information reading means 51 is a spare field in UDF, and all shift fields are the sums of the spare field of all zones.

[0049] In the Padding field 39 made into a primary allocation field, it is the field which is the classification of the short allocation descriptor for example, in UDF (Universal Disk Format) specification and which was used ["although assigned, it has not recorded", and].

[0050] The secured continuation field becomes possible [raising the probability to satisfy the specification as a field in which continuation writing and continuation reading are possible], without using a useless field from the time of the write-in initiation to a storage by using the storage condition of a record medium as mentioned above according to the gestalt of this operation.

[0051] (Gestalt 5 of operation) Drawing 7 is the outline block diagram of the recording device of disk media in which the gestalt 5 of operation of this invention is shown.

[0052] An information acceptance means to accept the stream information in which 72 contains at least one of an image or the voice in drawing 7 , An input setting means by which 71 sets up the attribute information on stream information, an information record means by which 75 carries out record-keeping of the stream information, The free-area management tool with which 73 acquires the information about the current availability of the information record means 75, A continuation field allocation means by which 74 secures a continuous field based on the information on the free-area management tool 73, and 76 are node information edit means to edit the information before and behind connection in the node of a continuous field.

[0053] Actuation of the recording device of the disk media of the gestalt 5 of the operation constituted as mentioned above is explained.

[0054] By the information acceptance means 72, the stream information containing at least one of an image or the voice is incorporated. Moreover, from the input setting means 71, attribute information, such as a transfer rate of the stream information incorporated and a stream class included, is set up. And the information about the present use field and present free area of the information record means 75 which record stream information with the free-area management tool 73 and which are a medium is acquired and managed. The continuation field allocation means 74 assigns the field in which the continuation writing and continuation reading based on the attribute information from the input setting means 71 and the management information of the free-area management tool 73 are possible to the information record means 75, and transmits the stream information sent to the field from the information acceptance means 72.

[0055] Then, when incorporation of single stream information is completed and new stream information is incorporated, edit processing of stream array information is performed in the node of the stream information currently previously written in by the node information edit means 76, and new stream information.

[0056] Here, the edit processings of stream array information carried out to the node information edit means 76 are the video of for example, an MPEG stream, relocation processing of an audio packet train, etc.

[0057] In the case of an MPEG stream, edit processing of stream information is explained in more detail using drawing 8 . Here, the case where Stream#2 of 82 are incorporated is explained after incorporation [81] of Stream#1.

[0058] If the pack train of 84 of the tip of Stream#2 is connected as it is when the array of the video (V) in the termination of Stream#1 of 81 and an audio pack (A) has become the list of 83 including for example, a dummy pack (D) By reading processing of the dummy pack of Stream#1, there is possibility that an exhaustion or continuation playback of Stream#1 and Stream#2 will break [the read in of the video pack (V) of Stream#2 / the residue of a delay video buffer] off.

[0059] So, in this invention, processing which replaces the dummy pack of 85 of Stream#1 in the video pack of 86 of Stream#2 at the time of write-in initiation of the stream information on Stream#2 is carried out.

[0060] According to the gestalt of this operation, in the node of stream information, possibility of making playback between stream information breaking off is mitigable by performing edit processing of stream array information as mentioned above.

[0061] In addition, with the gestalt of the above-mentioned operation, any of the program in hardware or a microcomputer are the optimal chooses each means as a component, and it is realized.

[0062] Moreover, as for this invention, it is clear for this contractor that the disk media recorded by the record approach of disk media which is not limited to the recording apparatus of the disk media which consist of above-mentioned components, and was shown by the above-mentioned explanation of operation, and this record approach, the equipment reproduced from these disk media, and the playback approach are also included in this invention.

[0063]

[Effect of the Invention] As mentioned above, according to this invention, by using it from the field which assigns primarily the free space of the continuation field which was carrying out current reservation in the termination of stream information record, and was first assigned primarily previously on the occasion of record of the following stream information, it becomes securable continuously about the border area of stream information, and the continuation playback over between streams is attained.

[0064] Moreover, according to this invention, it becomes possible to raise the probability for a continuation field to be securable by expanding and contracting a complement field, using the defective information on disk media.

[0065] According to this invention, it is before and after connection of stream information, and stream information is edited and lack of stream information can be prevented further again.

[0066] As mentioned above, this invention is effective especially when memorizing to disk media without the guarantee from which the field to write in is secured continuously sequentially.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The outline block diagram of the disk media recording device in which the gestalt 1 of operation of this invention is shown

[Drawing 2] The outline block diagram of the gestalt 2 of operation of the input setting means in the disk media recording device of this invention

[Drawing 3] The explanatory view of the continuation field complement actuation in the gestalt 1 of operation of the disk media recording device of this invention

[Drawing 4] The outline block diagram of the disk media recording device in which the gestalt 3 of operation of this invention is shown

[Drawing 5] The outline block diagram of the gestalt 4 of operation of the record situation monitor means of the disk media recording device of this invention

[Drawing 6] The explanatory view of the continuation field complement actuation by the record situation in the gestalt 3 of operation of the disk media recording device of this invention

[Drawing 7] The outline block diagram of the disk media recording device in the gestalt 5 of operation of this invention

[Drawing 8] The explanatory view of the node information edit actuation in the gestalt 5 of operation of this invention

[Drawing 9] The outline block diagram of record creation of the conventional disk media

[Description of Notations]

11 Input Setting Means

12 Information Acceptance Means

13 Free-Area Management Tool

14 Continuation Field Allocation Means

15 Information Record Means

16 Continuation Field Complement Means
